Unusual Printing Features on Early American Paper Money

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Early American printers were usually confronted with urgent requests by the authorities to prepare paper money as quickly as possible. For the period up to the American Revolution the required approval by British authorities of any authorization by an American assembly was often denied, delayed or conditioned, so that printing a much needed issue could not be undertaken until approval came. After the Revolutionary War began, every issue was an emergency. Thus printers and engravers were forced to expedite their work in producing money which had to be acceptable and protected. The printers and engraving artists had to plan and work together. There was always a choice as to whether the engravers would cut a complete copper plate or only cut elements in metal or wood for inserts or to cast inserts for typeset paper money. In the course of this work ingenuity and expediency were resorted to, coupled with short cuts, novelties and some errors. The printing of the money, whether from engraved plates or by letter press, had to be done on one side of a sheet at a time followed by drying time for the sheet whether it was printed on the back or not.

In the study of these paper money issues certain unusual printing features are evident and are categorized in the grouping which follows.[1] The illustrations are primarily parts of bills showing the specific features described and are placed as close to the descriptions as is practical.[2]

Denominational Insignia

Denominations were customarily written in lettering or numbers or both. A decorative symbol representing the denomination was sometimes added.

As to shilling denominations, a common usage of a "crown" for 5 shillings and "crowns" for multiples thereof caused appropriate symbols to be included in bills printed by Benjamin Franklin (fig. 1). In Pennsylvania, probably beginning on April 10, 1731 (certainly by August 10, 1739), and in Delaware beginning on March 1, 1734, crown symbols in an appropriate number are evident on bills of five shillings or multiples thereof. Those crown symbols continued to be used into the American Revolution.

The New Jersey issue under the February 10, 1727/8 Act originally designated the sun and moon as symbols for specific denominations. Half a moon was 3d; one moon was 6d; two moons 12d; and 2 1/2 moons 15 pence. Half a sun was 30d; a full sun £3; and two suns £6. Whether Benjamin Franklin, who was working for Samuel Keimer in printing that issue, influenced the legislature to adopt such a system is not known. This system was impractical because the

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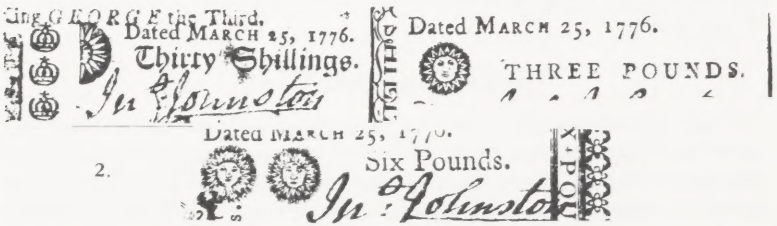
moon and the sun were the same circular shape and had to be distinguished by rays. Franklin sometimes used crown symbols on appropriate New Jersey issues through July 2, 1746 (fig. 2). The sun symbol was retained for 30s., £3, and £6. James Parker as printer for issues of May 15, 1755, and until the American Revolution, used crowns on the face and back and retained the sun symbol for the 30s, £3, and £6 denominations. Isaac Collins continued the practice.

In Connecticut for the redated issue of May 1713, an animal or the name of a color was engraved on the plate to tie into the denomination and these were to be printed in the color named. This was impractical and some later issues retained only the animal printed as part of the face plate.

In New York pound weight symbols were adopted beginning in 1737 for designation of "pounds" as a monetary denomination.



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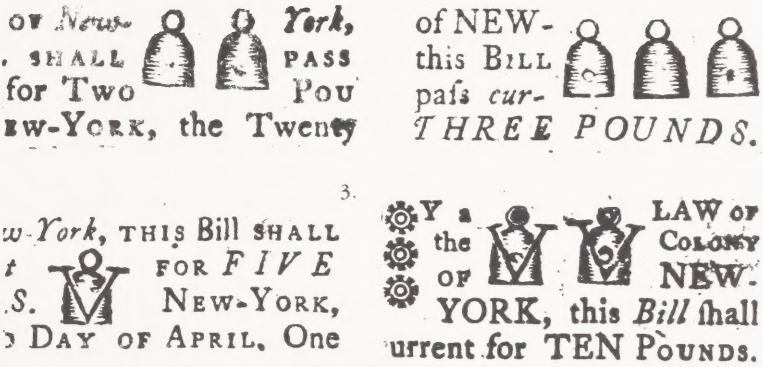


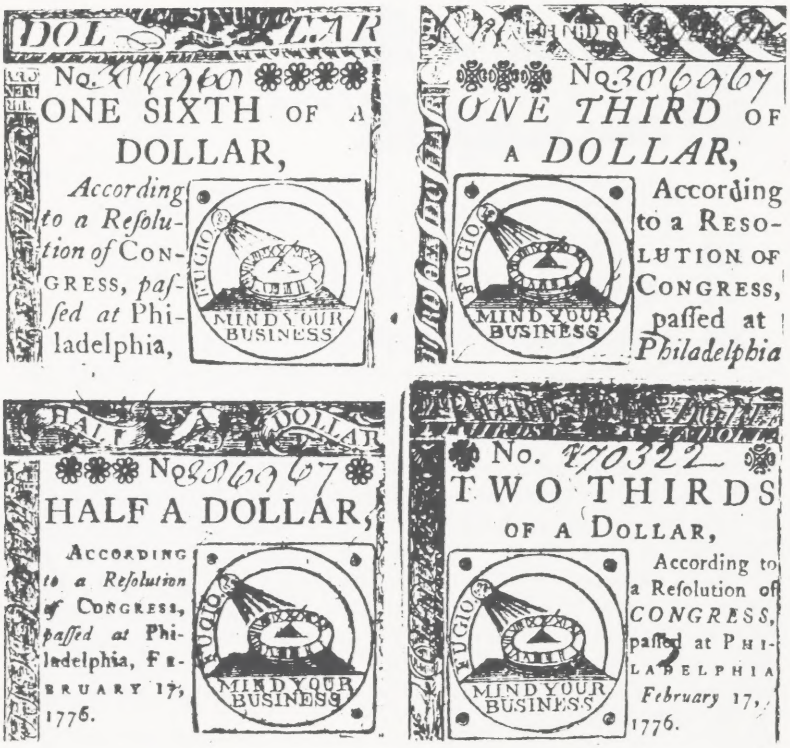
They were bell shaped and of the type used on scales. For denominations of £1, £2, and £3, the number of pound weights indicated the denomination. For denominations of £5 and £10 there was a V for 5 placed over the pound weight symbol to hold the number of needed symbols to a minimum (fig. 3). These insignia were inefficient as the distinction between a weight without a V over it and one with a V over it was difficult, particularly for the £2 and £10 both of which had two weight symbols side by side. Thus they were inadequate for accurate recognition of a denomination or as an alteration deterrent.

In some issues of bills the text on the face or on the back of a bill was sometimes arranged in a specially outlined shape for each denomination. In the Arms or seal on some issues the shape was different for each denomination. These denominational differences were in addition to the size and shape of the bill itself.

In the February 17, 1776 fractional issue of the Continental Congress, there are respectively one, two, three or four ornaments outside the circle of the face device, the number of ornaments increasing in the rising order of the four denominations (fig. 4). Yet the rosettes under the top border of the face vary in number and in placement and have no relationship to any denomination or its order in the issue.

Drawn and Quartered

The early bills of the New England colonies were about 4 inches wide and 5 1/4 inches high. This size was too large to put conveniently into a purse or pocket without folding. Thus bills were often folded in half in each direction and then unfolded when spent,



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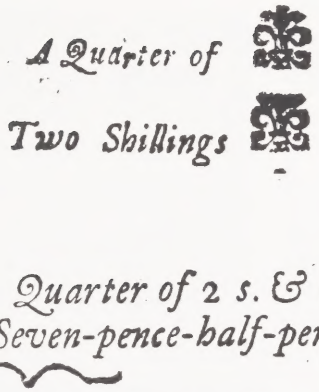
creating creases and splitting along the folds. It became convenient when the bill split apart to use a half or quarter section as change rather than paste or sew the parts together. Some people tore the bills deliberately to make change.

Massachusetts, in order to protect its citizens, passed a 1719/20 Act prohibiting the acceptance of sections of Connecticut bills of less than one-half. This in reality constituted an approval for bills to be torn in half for change. On June 15, 1722, Massachusetts appointed a committee to investigate the sectioning of bills. Connecticut in May 1726 prohibited the use of sectional Connecticut bills after May 1, 1727, but such laws did not stop the public from circulating sections of physically large size bills. The denomination of the torn sections could not always be easily ascertained. Connecticut by a May 1736 Act prohibited sectioning of bills of 5 shillings or greater, apparently being unconcerned about the sectioning of



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its outstanding 2 shilling, 2 shilling 6 pence, and 3 shilling bills.

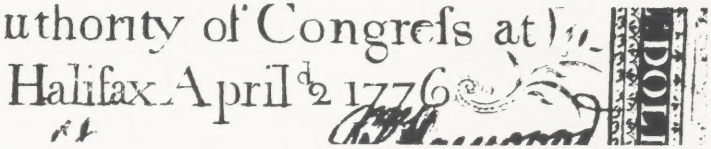
Connecticut found a way to solve the problem somewhat when it issued bills pursuant to its October 9, 1735 Act. On each quadrant of the letter press backs of its eight denominations from 2 shillings to 5 pounds of this redated July 10, 1733 issue there was printed "Quarter of 2 shillings," "Quarter of 3 shillings" or similar appropriate language on other denominations. It was apparently simple for the public to make the calculation. In the redated issues from July 10, 1733 up to the May 8, 1745, the quadrants on the back carried similar language (fig. 5). But then the calculation of the quadrant's value is printed on each of the four quadrants on the back on the only known piece as:

Quarter 2s. & 6d.
Seven-pence-half-peny

This assistance nevertheless required a person tendering half a bill to make a further calculation.

Mirror Image Errors

For an engraver to cut an intaglio mold into which lead is to be poured to make a cast for a printing cut, it is not necessary to make a mirror image (reversed) or mirror image lettering. The cast becomes the mirror image and the printed sheet appears the same as the original mold. It is just the opposite for both an engraved printing plate or a wood block which must be cut in mirror image. An eighteenth century engraver had to be skilled in cutting either way. It is therefore understandable that an engraver may on occasion have been forgetful of the image transfer sequence he was to prepare and cut a design or letters in a reversed manner.



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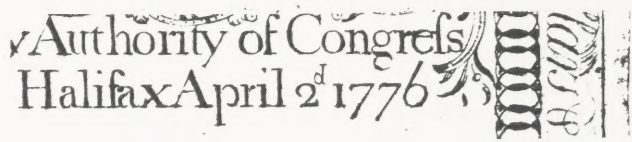
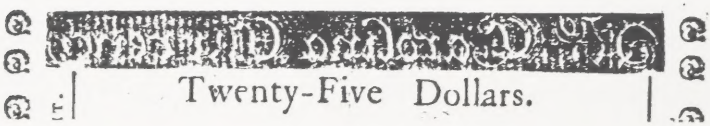


Examples of such errors are found on the early paper money. In the Continental Currency issues the seal on the $5 denomination contains the word ABSTINE which was cut into the seal mold. For the issues prior to July 17, 1776, the B is normal and well cut. It was determined to strengthen the motto in the seal and in so doing the vertical stroke on the B was cut in backward, being on the right instead of the left. The engraver thought he was cutting in mirror image. The result was two vertical sides to the B which makes it appear somewhat like an H. This error is evident in the July 22, 1776, and all subsequent issues of the $5 denomination.

In the North Carolina $5 Triton design, the date is intended to be April 2d, 1776, as on other denominations but appears as April d2, 1776 (fig. 6). The engraver, Gabriel Lewyn of Baltimore, forgot for the moment that he was supposed to be cutting from right to left and was supposed to place the number and the letter in reversed order, even though he did remember to cut each of them in the proper mirror image.

In the May 15, 1779 North Carolina issue, the top border cut contains the words "No Carolina Currency" in white script letters on



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a black panel. On one variety of the printed $25 bill all letters appear in mirror image while in all other bills the lettering in the top border is correct (fig. 7). This was apparently due to the engraver being under the impression that he was cutting a mold from which a cast would be made rather than engraving a cut which was to be used directly in the printing form.

In all $3 Continental Currency bills up to January 20, 1779, the seal depicting a fight between an eagle and a crane originally had the birds facing left, but when the new and smaller copies of the seals were engraved for the 1779 issue the birds are facing right (fig. 8). This is the only one of the Continental Currency seals which was copied by cutting the seal as it appeared on prior bills instead of cutting it in mirror image.

Backward S

The S in SHILL in the two side border columns on the face of the 10 shilling denominations of the October 25, 1755 Pennsylvania issue is in mirror image (fig. 9). This mistake of reversal was made by the engraver who cut the intaglio border mold from which both borders were cast. These erroneous side borders were used for printing the 10 shilling on 13 out of the 16 issues of the 10 shilling denomination for a period of about 21 years from 1755 through

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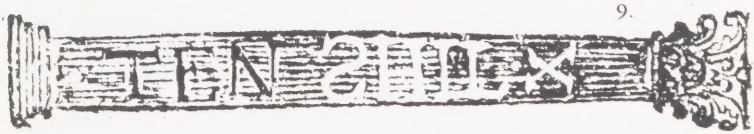

1776. The three issues on which no erroneous die border was used on the 10 shilling denomination were those of March 10, 1769 (no engraved side border), October 1, 1773 (new columnar side borders with ten shillings in script) and October 25, 1775 (same as October 1, 1773). In the July 20, 1775, December 8, 1775 and April 25, 1776, issues the 10 shilling denominations contained only one erroneous die border, the other being the script border previously used. The printing frame used to impress each sheet of bills containing erroneous side borders held the faces of two 10 shilling bills (Plate A and Plate B), thus putting four erroneous borders in use at one time through March 20, 1771, and two erroneous borders in use at one time in the three above named subsequent issues. Franklin and Hall as printer and its successor, Hall and Sellers, printed an aggregate of 171,400 bills containing this very obvious error. The erroneous border castings as they wore out or broke were probably replaced with new castings from the same mold, apparently because the error was not considered of sufficient importance to merit engraving a new mold. Perhaps Franklin concluded that it was a curiosity which people might notice and talk about. It certainly was no deterrent to counterfeiting.

Upside Down

Instances of decorative cuts being placed in the printing form upside down are uncommon. In the 6 shilling bills of the Pennsylvania issue of March 20, 1773, the arms of Pennsylvania on Plate A are upside down as related to the text whereas the arms of Plate B are properly positioned. These arms are both cast from the same mold and a correction could have been made in the course of printing by loosening the printing frame and rotating that element to the proper position in that form. Hall and Sellers obviously did not notice the error.

In the Continental currency issues, the four face border designs contained engraved text in elaborate form. The choice made in positioning those borders on all integral denominations was for the base of their text to be located toward the inside of the note and the top of the text to be on the outside. This would enable some of the bill to be read right side up regardless in what position the face of the bill was held. While this put the bottom border upside down in relation to the central typeset text it conformed to the juxtaposition of the side borders.

All of the Continental Currency borders on the integral denominations are so placed except the bottom border of the $4 denomina-

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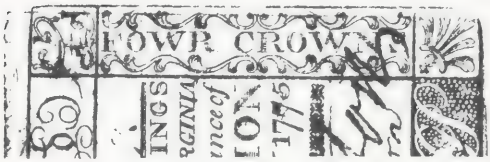
tion of the May 9, 1776 issue (fig. 10). It reads from the same direction as the central type set text and that border is therefore upside down. So far as is now known this was not corrected until the July 22, 1776 issue when the same border is rotated into its intended position.

Spellbound

Some few accidental spelling errors in paper money are found more in the cast decorations or in the engraved plates than in the setting of the type. The type setters were naturally more skilled in spelling. When the denomination of the 7 shilling Connecticut issue of May 8, 1740 was spelled "SEAVEN" the engraver must have had his mind on the hereafter. This was not corrected in subsequent redatings of bills printed from that plate. When in Rhode Island the 6 pence bill of February 14, 1743/4 had a portion of its Latin motto spelled "SPEARMUS" instead of "SPERAMUS", the engraver must have been in a belligerent mood. This error, after continued use for that denomination in redated issues was finally corrected in the 1747/8 redating.

In the Virginia issue of July 17, 1775, the 1 shilling 3 pence bills were equivalent in stated value to the Spanish pistareen, but "PISTEREEN" was misspelled in the border. This border was used again in the May 6, 1776 Virginia issue for that denomination. The Virginia 20 shilling of both of these issues had its denominational equivalent in its right border as "FOWR CROWNS," the engraver obviously being influenced by the OW in CROWNS in making his misspelling (fig. 11). In the Virginia motto used in the arms of its



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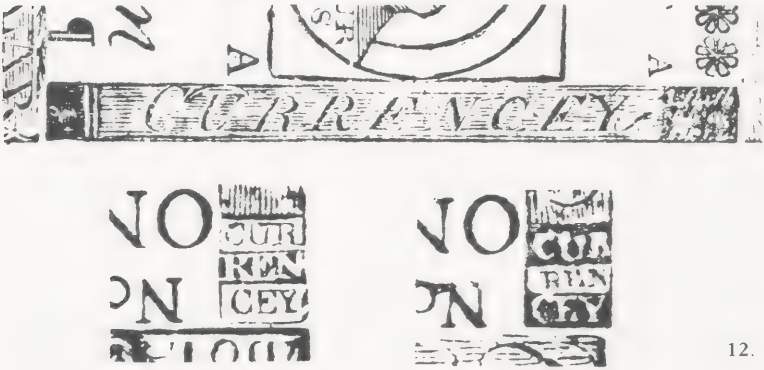
May 5, 1777, October 20, 1777 and first May 4, 1778 issues the word "TYRANNUS" was misspelled, but was corrected to "TYRANNIS" when new arms molds were made for the second May 4, 1778 issue.

A well known and pervasive spelling error occurred on the Continental Currency fractional dollar issue of February 17, 1776. Elisha Gallaudet engraved the mold from which the decorative border elements were cast. The misspelling of "CURRENCEY" appears twice on the face of an aggregate of 600,000 notes of $1/6th denomination (fig. 12). These $1/6 bills were printed from plates A, B, and C as part of every sheet of that fractional issue. The words "CONTINENTAL CURRENCY" were spelled correctly on all other bills of all issues both before, during and after February 17, 1776. The misspelling occurred in large slanting block letters at the top of the left border. At the top of the left border the "CEY" is black on a white background in plate A while it is white on a black background in plates B and C. No correction was made and no further $1/6 notes were issued.

This misspelling was compounded and repeated by Gallaudet in preparing dies for the 1776 Continental Currency coinage. That die sinker had first misspelled "CURENCY" (Obverse 1) and corrected it in making the next die (Obverse 2). His next misspelling was "CURRENCEY" (Obverse 4) repeating what he had done on the paper money. This was noticed and corrected (Obverse 5).



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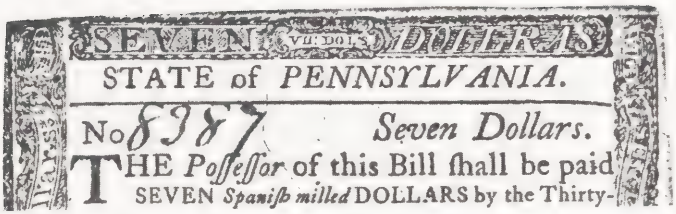

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Hall and Sellers as official printers for the Continental Congress prepared the money for each state pursuant to the March 18, 1780 Act authorizing the exchange of $40 in Continental bills for $1 in 1780 issues. In the $7 bill for Pennsylvania the word DOLLRAS is engraved in the top border with a Cajun accent spelling (fig. 13). DOLLARS is correct in the same border in the issues emitted by other states participating in the exchange program.

A punctuation error was made in the counterfeit warning in the New York bills from July 21, 1746 through February 16, 1756. "Its Death to counterfeit this Bill" omitted the apostrophe in the first word. This was not corrected until April 20, 1756, when the apostrophe was added for that and the next issue, but for the April 2, 1759 emission and thereafter a modification of "It's" into "'Tis" was made so that it read "'Tis Death to counterfeit this Bill."

In the New York £2 for the February 16, 1771 bill, the date was written as "February, 16, 1771" with an extra comma (fig. 14). This was noticed and promptly corrected for the balance of the printing run.

In the April 20, 1781 Pennsylvania issue, plate A of the 3d denomination is spelled with "Penee" instead of "Pence." On plate B the spelling is correct. If the colloquial pronunciation of "thrippenny" was customary the misspelling may be somewhat understood (fig. 15).

The South Carolina issue authorized on December 23, 1776, was issued in 1777 as printed on the backs, but the typesetter on the $2 and $4 denominations set the authorization date as December 23, 1777 (fig. 16). This was noticed during printing and before the issuance the misdating was changed in ink on those bills which had been printed and the correction made in the printing form for printing the balance of the issue.

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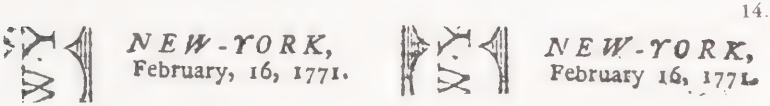

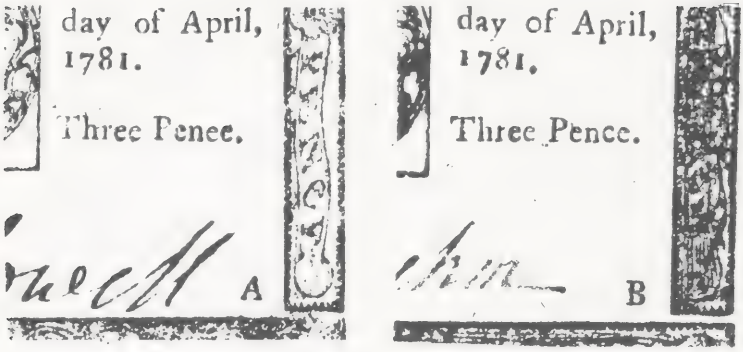

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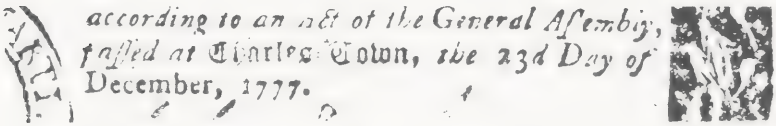

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A Spelling Teaser

An obvious and major spelling curiosity in the printing of the bills of Pennsylvania is the spelling of the name of the Province with four different variations, Pennsylvania, Pennsilvania, Pensylvania and Pensilvania (fig. 17). That occurred in at least 20 issues over a period of at least 37 years. How early this happened is not now determinable because probative examples of many of the early Pennsylvania bills are not known. The August 10, 1739 issue contains the variation, Pensilvania, and was printed by Benjamin Franklin. Before Franklin began printing Pennsylvania bills in 1731 there is no misspelling known. Because Franklin would not have permitted such misspelling to go uncorrected for so long, the conclusion that the misspelling was deliberate must be assumed.

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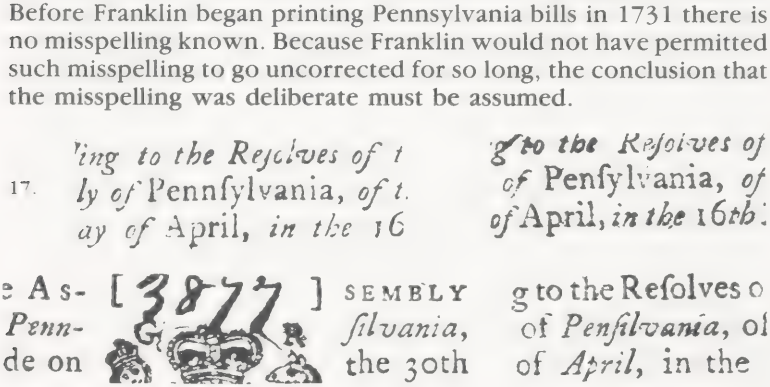


The systematic misspellings also indicate a voluntary plan of spelling variation. In the October 1, 1755 issue, at least the second group of four consecutive denominations have four different spellings, the first consecutive group of four possibly having them also, but some bills of that issue are unknown. The pattern in the many subsequent issues up to July 20, 1775, confirms four different spellings for four consecutive denominations and the spellings are customarily in the same order. During this period when two bills (plates A and B) or four bills (Plates A, B, C and D) of the same denomination were printed for any issue the spelling was identical on each bill of the same denomination. Likewise the same denomination of issues of various dates carries the same spelling previously used. Some minor irregularity emerged as new denominations were added, old denominations eliminated, or denominations were provided in other than groups of four.

In the issue of July 20, 1775, which was the first issue by Pennsylvania during the American Revolution, the spelling procedure was changed. There were four denominations, each having two plates. Each of the two plates of the same denomination curiously carried a different spelling. The same four original spelling variations were used in this issue, but the same spelling variation was used only on half of the bills of two of the denominations instead of only on bills of one denomination. The original pattern of variation was restored for the October 25, 1775 emission. When the December 8, 1775 issue appeared, however, both plates of each of the two lowest denominations had the correct spelling while both plates of the two higher denominations used the original variation pattern. By the April 25, 1776 issue, each of the three plates of both the 6d and 9d in the four low denomination group carry the identical misspelling PENSYLVANIA, breaking the original pattern; the next four highest denominations, each with two plates for each denomination, have a spelling pattern exactly like the July 20, 1775 issue. During the American Revolution the need for haste in printing money might have taken precedence over the original spelling variation system.

The misspelling or variation in spelling of Pennsylvania by the general public in the first three-quarters of the eighteenth century was not unusual. A logical counterfeiter would copy a genuine bill with a misspelling and would not correct it or change it. If however a counterfeiter noticed a misspelling on a bill, that might have discouraged counterfeiting that bill for fear that before the counterfeits could be prepared, corrected bills would have been issued and the error bills announced and withdrawn. Yet some of

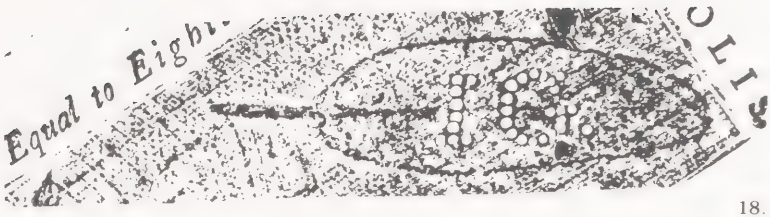
the denominations had the correct spelling of Pennsylvania. It appears that counterfeiting protection was not the basic reason for the variations in spelling.

Possibly the protection sought was to deter alteration of the denomination of a bill by raising it to a higher amount. The denomination to which the bill might be raised would have a different spelling variation from the genuine bill used for alteration. Therefore altering denominations would require extra work to change the spelling or risk entrapment by not changing it. This would discourage the alterer as the work had to be done one bill at a time. Even if the general public would not check the spelling to determine if a bill were raised, certain merchants might check that feature in addition to the treasury officials. The fact that some low denomination bills had the same spelling of the Province name as certain high denomination bills would be offset by a difference in size or design. It must therefore be concluded that the variations in spelling were intended to be alteration deterrents which Franklin introduced into the printing of money. He must have enjoyed the wonderment he created among the good spellers and the confusion he created for potential denominational alterers. His nature printed backs on bills deterred counterfeiting of the bills he printed and his spelling confusion could have discouraged alteration of them. These ideas to prevent fraud must have been very effective in helping Franklin convince the authorities to give him, his firm and its successor the printing contracts for paper money.

Eccentricities

A curious correction of the wording of the engraved plates for bills of the Connecticut issue dated May 8, 1740, resulted when the Crown changed the redemption status of the emission. The language of the complete plates ended with "in all payments and in the Treasury." It was ordered that the word "and" should be eliminated, restricting the legal tender meaning. The word "and" was hammered out of some plates, but in others the word "and" had horizontal lines scratched through it. As a result the use of those plates which were redated for several issues thereafter showed a word scratched out.

Words with a line through them are found in the border ornaments of all New York £5 and £10 bills of December 10, 1737 through May 10, 1746 issues. It is a puzzlement as to why this was done only on the two highest denominations. No help as a counterfeiting deterrent seems logical unless it was felt the



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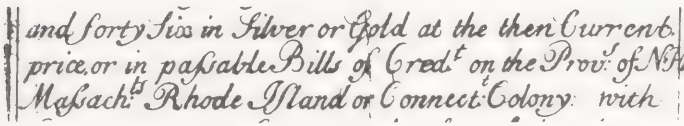
counterfeiter would think the lines were only on a few of the bills due to an accident. As an alteration deterrent in raising bills it is of little value because a line could easily be inked in. If the border molds had been considered unsatisfactory and the portion to be redone was so defaced, there could have been a decision to use them nonetheless and not make new molds.

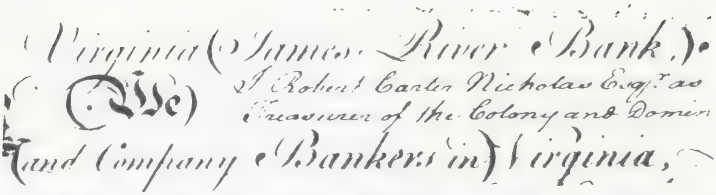
Some of the engravers of cuts for the paper currency put their names or initials on the cuts, such as David Rittenhouse, Thomas Coram, James Smither and Thomas Sparrow. It was customary for the printers to put their names on typeset currency. Jonas Green was very proud to have made nature prints for the Maryland paper money issue of 1767 and with a punch hammered out his initials I G into the nature print for the $4 denomination (fig. 18). Even though he and later his family as successors to his currency printing put their names as printers on all typeset bills before the American Revolution, Jonas Green's initials were conspicuously retained on that $4 Maryland nature print.

On the 10 shilling New Hampshire bill of 1734, the engraver carefully boxed in the area for the engraved text with an engraved border but at first omitted the "Hamp'r" of "N.Hamp'r" in the engraved text. This was corrected by adding "Hamp'r" through and outside the border (fig. 19).

Handwritten parentheses were used on a 1773 Virginia emergency issue to eliminate printed language on unissued currency forms. It had then been hoped that the operation of the James River Bank would be authorized by the crown and specially engraved forms for currency had been received in Virginia awaiting that approval before issuance. When Virginia needed an emergency money issue in 1773, there was no time to wait for normal currency prepara-


and Forty Six in Silver or Gold at the then Current
price, or in passable Bills of Credt on the Provs of N.Hamp.
Massachts Rhode Island or Connect Colony with

19.


Virginia (James River Bank)
(We) I Robert Carter Nicholas Esq.r as
Treasurer of the Colony and Domin
and Company (Bankers in) Virginia,

20.

tion and it was realized that the available James River Bank forms could be quickly adapted for use by the Colony and Dominion of Virginia by adding some words to and eliminating some words from these forms. Adding words could be done by handwriting or overprinting but elimination by striking out words would have created an unacceptable appearance. The decision made was to write in the needed text and to bracket out with inconspicuous parentheses the portions not to be effective (fig. 20). The use of parentheses was expedient and barely recognized. The public was only interested in reading the denomination and not the text of the bill. Why imprinting the additions, including he date and denomination, were not undertaken in lieu of tedious extensive handwriting is difficult to fathom. Yet the September 1, 1775 emergency issue using the same leftover forms was filled in by hand but had no elimination of words by parentheses or strike outs. The original solution is apparently unique in numismatic history.

The North Carolina issue of April 2, 1776, although very quaint and charming, is incomprehensible as a practical money issue. Its engraved bills contained 56 differently designed vignettes ranging from eight varieties for one denomination down to one for a denomination. Each bill has a different vignette and there is no relationship between the vignettes and the denomination.

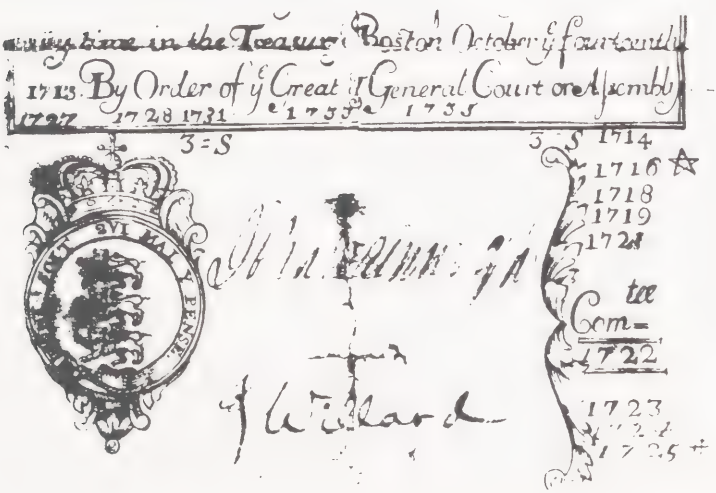
The vignettes include mammals, birds, fish, reptiles, insects, food, mythological beings, man-made objects and insignia. Uniformity of a denomination is desirable but Gabriel Lewyn, the Baltimore engraver, must have looked upon his assignment as an artistic challenge. His best known note is the $7.50 denomination with an intermediate state of the American flag combining a British Union with 13 stripes, a compromise position as to the outcome of the American Revolution (fig. 21).

21.

Redating

When copper plates were engraved by artists for the printing of bills they usually remained in good condition after a print run. If portions became weak the plates usually could be retooled and thus strengthened. When a new issue was authorized and it was determined that the existing plates could be reused, the bills would have to be distinguished easily from a prior issue in circulation. Changing the back of the bill was not as satisfactory as changing the face. Changing the date on the copper plate was first done in 1708 from the Massachusetts issue of November 21, 1702. Adding a new date was simpler. This method of redating began in Massachusetts when the May 31, 1710 plates were redated 1711 by adding 1711 to a lower right side space without disturbing the original date. This practice continued in Massachusetts from time to time through 1740 with some bills having 18 redatings (fig. 22). When two issues occurred in the same year, an asterisk or other mark was added after the first used date for that year. Connecticut, New Hampshire and Rhode Island adopted similar practices of redating. In Rhode Island redating of the face plate was sometimes not undertaken further when there was no more room to add another date and then the date of the new issue would be included in the typeset back. Where old style years were in transition the redating conformed by using dates such as "Mar 14, 1744/5."

22.



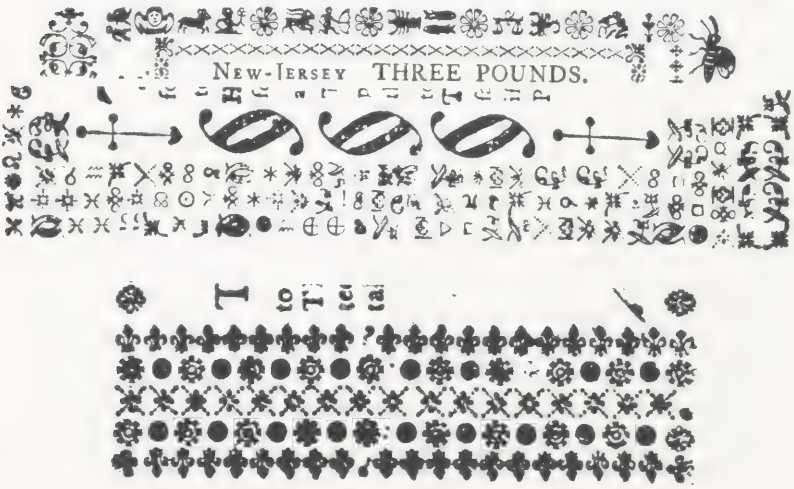
Ornamentation

There was wide variety of foreign-made letter press ornaments available to American colonial printers for use in newspapers, books, pamphlets, advertising and notices. They were of various sizes to coordinate with various type sizes. They were used alone or combined for headings, separations, emphasis, borders and other uses to make printed matter more appealing. They came in geometrical, astronomical, linear, floral and other standard designs. They were distinct from scenes, vignettes, arms, insignia, and other special purpose cuts engraved by colonial artists. The standard ornaments were good counterfeiting deterrents because they could be well mixed and not all were readily obtainable.

Georgia issued most of its bills replete with rows of ornaments as borders and as decoration, and included letters and punctuation as part of such ornamentation. Georgia used question marks for the first time on paper money not realizing those issues would ironically soon be of questionable value. Sometimes the ornaments became loose in the printing form or fell out or broke. This usually required a change or replacement and gave rise to a different numismatic variety for any such bill.

A row of bees lies across the back of the March 25, 1776 New Jersey £3 denomination. South Carolina used available Hebrew letters as ornaments on some of its 1776 issues. Examples of some of these ornaments are given in fig. 23.

23.

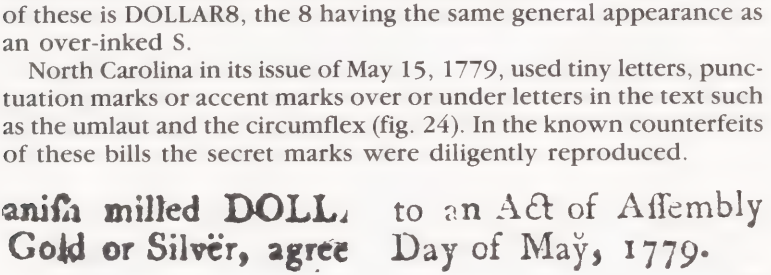


The Not So Secret Marks

Maryland was the first colony to place secret marks on its bills to help identify counterfeits and alterations more easily. For the issues of 1767, 1770 and 1774 there were the same uniform oddities on each of the denominations. They include tiny, unnecessary, printed elements, incorrect or missing punctuation, and the letter N in mirror image. These were supposed to remain unnoticed because there were such obvious and highly visible errors, such as an undersized out of line letter in a word with a caret under it; as many as three different type fonts used in each line of text and often twelve different type fonts used in a single bill.

The Virginia typeset bills of July 14, 1780, October 16, 1780 (both series) and March 1, 1781, have a group of spelling errors in the higher denominations but with one exception none in the lower denominations. This is clear evidence of an alteration detection plan. BILL is misspelled QILL and DILL; DOLLARS is misspelled DOLLANDS, DOLLARAE, and DOLLAR8; HUNDRED appears as HUNDNED; POUNDS as POUNS; and FIVE as OIVE. The cleverest of these is DOLLAR8, the 8 having the same general appearance as an over-inked S.

North Carolina in its issue of May 15, 1779, used tiny letters, punctuation marks or accent marks over or under letters in the text such as the umlaut and the circumflex (fig. 24). In the known counterfeits of these bills the secret marks were diligently reproduced.



24.

Seeing Red

Two color printing was discouraging to counterfeiters and was undertaken in some paper money issues as a deterrent. It was additional work for the printer and an additional burden for the counterfeiter. It began in America in the New England colonies when the protective indenture design on the back of the bills of Massachusetts Bay for November 2, 1702, was printed in red. By the issue of November 2, 1708, for which fine paper had been obtained from the Company of Stationers in London, there are large initials A R (Anna Regina) in ligature (half normal and half mirrored) printed in red on the face of the bills. This same design was used in issues of Connecticut and New Hampshire in 1709 and gave rise

to the name "red figured" bills. In New Hampshire in 1717 G R (Georgius Rex) had been placed on the back of lower denominations and C N H (Colony of New Hampshire) on the back of the upper denominations in similar fashion to the earlier use of initials.

Connecticut in 1713 printed the name of a color on bills and printed that name and an insignia in that color, the balance of the bill being printed in black ink. The committee signatures were to be written by hand with the same color ink as the portion of the bill printed in color. These procedures were totally impractical.

New Jersey began multi-color printing of its sage leaf bills with the July 2, 1746 issue by using a combination of some red and some black ink parts to distinguish the higher denominations of £3 and £6 from the lower denominations from 1 shilling to 30 shillings which were printed only in black ink. In the January 26, 1756 issue a further distinction was made by printing only the £6 note in red and black, changing the 30 shilling and £3 notes to all red and leaving the lower denominations in black. In the June 22, 1756 issue the faces of the 30 shilling, £3 and £6, being the three highest denominations, were printed in red and black with the back of the £6 note printed in green. In the April 12, 1757 issue only denominations of 15 shillings and above were issued and the faces were all printed in red except the £6 note which was printed in red and black on the face and a continuation of green on the back. By June 14, 1757, another color arrangement resulted in every bill being printed in black except that the face of the £6 was in red and black ink. In November 20, 1757 and May 1, 1758 issues all faces of bills were printed in red and black, thus adding 6 shilling bills to the two color category. For the October 20, 1758 issue, the 30 shilling and the £3 bills retained red and black faces but the £6 bill was printed in red and brown on the face and brown on the back. By this time there was no correlation between denomination and color except that bills below 6 shillings were always printed in black and bills of £6 were always in two colors. By the April 10, 1759 issue, the brown color ink was abandoned. In the April 12, 1760 issue, the bills of 6, 12 and 15 shillings went back to black ink only, but by the April 23, 1761 issue, red and black was resumed for 12 shillings and above. The April 8, 1762 issue changed the face of the £6 bill to red and blue which was continued for all the sage leaf issues through March 25, 1776, when the £3 was also printed in red and blue. That issue also brought red and black for the first time to the face of denominations as low as 1 shilling.

Most of the higher denomination New Jersey bills continued to circulate until the American Revolution in spite of their original

redemption and invalidity dates and are often found torn, dirty, split and patched from extensive use. They are a colorful group of notes nonetheless.

Although Pennsylvania bills had red and black printed text on their face and back by 1759, a remarkable printing skill was demonstrated with the October 1, 1773 issue. A portion of the primary face letter press text of the bill was printed in red in the shape of a symbol for the denomination and was closely surrounded by the balance of the text printed in black. Roman numbers X, XV and L were respectively printed in red on the denomination corresponding to those amounts and a large lower case 1 representing "libra" or "pound" was printed in red within the 20 shilling text. One decorative border on each denomination has its central portion printed in red while the balance of that border is in black. There is perfect registry of the two color wording in the text and in the two color portions of the border design in all bills examined. There is no visible evidence that a separate printing frame was used for each color.

In Georgia red and black ink combinations on bills began in 1765 and involved only certain words being printed in red ink. When the 1776 sterling issue was prepared, the two highest denominations had red and black ink on their faces to distinguish them from lower denominations printed only in black. When the dollar denominations appeared in 1776, the two color principle was restored and colored seals were added by a separate pressing in light blue, orange, green, red and blue-green. In the June 8, 1777 issue, the red printed portions at first permitted the "to" in the fourth line of the text of 1, 3, 4, 5 and 8 dollar denominations and the "in" in the fourth line of all integral dollar denominations to remain in black while the balance of the line was in red. This became such a problem in registry for the red impression that the text had to be reset so that the "to" was moved to line 3 and the entire fourth line was set in red rather than only most of it.

The final issue of Continental Currency of January 14, 1779, was printed in red and black on the face and back. In addition to some borders, an interior portion of the emblem on both face and back was printed in red. There is a very thin white margin around the red portions indicating that they were apparently cut out and removed from the basic frame for black printing and were separated or offset for red printing. This ability to register the sheet for the second printing in a separate printing frame with parts of the devices by the simple use of two projecting nails to put the sheet in an identical position was a masterpiece of printing achievement.

Nature Printing

Examples of Benjamin Franklin's nature printing invention are found on paper money issues of New Jersey, Pennsylvania, Delaware, Maryland and the Continental Congress. This 1737 invention of Benjamin Franklin consisted of a plaster mold from an actual leaf. A lead cast for printing was made from the plaster mold and was combined with set type in the printing form.[3]

The Printer's Puzzle

There was often a problem in each issue as to the quantity of each denomination to be authorized as part of the monetary total. The number to be printed of the more needed denominations was far different than the number of less needed denominations. After the monetary total of an issue was determined the printing problems also had to be faced. The sheets of paper for printing bills usually would hold four to sixteen notes depending primarily on the size of the bills. Sometimes an Assembly in setting quantities of each denomination would ignore the printer's problem. If more of the lower denominations were needed than higher denominations this often could be arranged by putting one group on one printing plate or form and the other group on another, and then making a different number of pressings from each. Another solution was to have a combination of denominations on one printing plate with only one of each less needed denomination and more than one of each more needed denomination. This practice could produce different amounts of each denomination from a specific number of sheets of paper. A full sheet had to be printed with each pressing or the waste of paper and labor would be substantial.

In letter press printing of bills one side of a bill was customarily assembled separately from type, ornaments and insignia. A group of such bills was locked into a printing frame which was slightly smaller than the size of the paper sheet. The backs were blank. If printing two sides of a bill was desired there had to be two pressings to complete a sheet of the bills. If the forms for the faces and their respective backs were both placed facing upward at the opposite sides of the same frame then after one side was printed and dried the sheet could be properly rotated and replaced on the same frame for printing the other side, thereby completing both sides of all bills in the frame.

To satisfy situations where printing from any frame would not result in the required number of each denomination, a substitution of one or more additional bill forms could be resorted to. In the

first Continental Congress issue of the May 10, 1775 session, the authorization of 49,000 each of eight denominations ($1 through $8) on June 22-23, 1775, was a properly planned arrangement for eight faces and eight backs in the frame, but on July 25, 1775, an additional 33,333 bills of $30 denomination were added. Since there was no more room in the frame to solve the problem, a game of musical chairs developed. Pressings of the eight faces and eight backs of the original denominations would have to be done 19,824 times, producing two bills of each denomination for each two pressings. Then the $30 bill form was substituted for the $1 denomination for 4,168 pressings; and similarly for each of the remaining denominations. This produced 33,344 of the $30 denomination and 29,176 for each of the other eight denominations. Adding the 29,176 pressings to the 19,824 initial run produced 49,000 of each of the eight lowest denominations. Therefore the total requirements for all denominations would be produced with an aggregate of 53,168 (19,824 plus 33,344) pressings. This efficient procedure did not involve the $20 denomination which was of a different size and separately printed on each side, one bill at a time, on marbleized paper obtained from Benjamin Franklin.

Another very flexible method of printing different quantities of various denominations was from time to time to change the denomination in an existing printing form by only resetting the denominational text. In this way denominational needs could be quickly and simply met. This procedure was used in Georgia during the American Revolution. The design and layout of ornaments on the borders of Georgia bills were varied and extensive. The text was short and direct. Whenever one or more denominations were needed the few letters designating the existing denomination would be changed and the border ornaments remained unchanged. Thus the same border ornaments are found in several denominations of the same issue and sometimes in those of different issues. There was little precaution against counterfeiting or alteration using this methodology but Georgia relied on two color printing and colored seals to protect its issues.

The skills, the endurance, the problems and the accomplishments of the colonial money printers and engravers make one appreciate not only Benjamin Franklin's genius as applied to that field but the amazing ability of many artisans and artists to furnish the colonial public with practical, beautiful and fascinating paper money.

[1] In the preparation of this study I wish to express my appreciation for the assistance and cooperation of Thomas Serfass of St. Louis.

[2] For the full image of the bill in many instances or for further information on any issue, reference is made to the author's *The Early Paper Money of America*, 3rd ed. (Racine, 1990).

[3] The development and extensive use of this anti-counterfeiting device has been previously detailed in the author's "Nature Printing on Colonial and Continental Currency," *The Numismatist* 1964, pp. 147-54, 299-305, 457-65, 613-23.